

The 50 MHz DX Bulletin

Volume 3

1992 June 8

Issue #6

122 Fields worked by W5OZI, NI6E/KH6, PY5CC, and 9H5EE:

The fields worked by the four combined stations are:

AE-AG-AH-AI-AK-AL
BG-BH-BI-BJ-BK-BL-BO-BP
CG-CM-CN-CO-CP
DG-DK-DL-DM-DN-DO
EI-EJ-EK-EL-EM-EN-EO
FD-FE-FF-FG-FH-FI-FJ-FK-FL-FM-FN
GD-GF-GG-GH-GI-GJ-GK-GN
HH-HI-HJ-KH-HL-HM
IH-II-IJ-IK-IL-IM-IN-IO-IP
JF-JG-JH-JI-JJ-JM-JN-JO-JP
KF-KG-KH-KI-KM--KN-KO-KP
LG-LI-LL
MN
NH
OF-OG-OH-OI-OJ-OL
PF-PG-PH-PJ-PK-PL-PM-PN
QE-QF-QG-QH-QI-QJ-QK-QL-QM-QN
RE-RF-RG-RH-RI-RJ-RK-RM-RO

1992 International 6 Meter Beacon List Now Available

Harry Schools KA3B has just published his annual megalist of 6m beacon information, based on information received in response to 131 survey forms which Harry mailed to all known beacon operators in recent months. This year's edition runs to 18 pages, plus an addendum to accommodate late survey responses, and contains the following details for 141 beacons: frequency, callsign, grid square, mode, hours of operation, location, transmitter type and power, antenna type and height, message text, address for reports, and any miscellaneous notes as appropriate. Many additions, deletions, and other changes have been made since the 1991 edition. This labor of love stands alone as the directory of 6m beacon data, and is highly recommended for all 6m DXers. To obtain a copy, send US\$5.00 (payable to Harry Schools) to KA3B at 1606 South Newkirk St., Philadelphia PA 19145. Shipping costs are included in the \$5.00 price.

50 MHz QSL Manager Listing Also Now Available

Harry Schools KA3B has issued his annual listing of QSL routing for DX stations and DXpeditions which have been active on 50 MHz since 1983. It contains 535 entries compiled from this Bulletin and many other sources. It can be obtained for US\$1.00 to Harry at 1606 S. Newkirk St., Philadelphia, PA 19145 USA.

Non-DX Contest News:

On June 6, from 0000 to 2400z, the UK6MG will hold their second Summer Sporadic-E contest. This year it is open to non-members as well as members. Work 2-ways on 6m or, for countries without 6m, crossband. All QSOs within your

own continent must be outside the DX Window of 50.110-130 (sic). Exchange callsign, signal report, grid square, and UK6MG membership number if you have one. Each contact with a member counts 2 points; others count one point. Multipliers are countries plus grid squares; one contact can count as both a country and as a grid square. Final score is total QSOs X total multipliers. There are 6 sections in all: (1) single-op U.K., (2) SWL U.K., (3) novice U.K., (4) all other U.K. including portable and multi-op, (5) Europe, and (6) Rest of the World. The G8VR cup will be awarded to the overall winner of the UK section, and a goblet will be awarded to the winners of the Europe and Rest-of-the-World sections. Certificates will be awarded to all section winners and runners-up. Any reasonably written log will be accepted as long as it includes the required exchange information. Copies of the entry form and official log sheets are available for a large SAE to GW8ZCP. Logs must be postmarked no later than July 8 to: Maureen Wright GW8ZCP, 6 Cwm Within, Wrexham, Clwyd, LL12 8JY, Wales, U.K.

The ARRL VHF QSO Party will occur June 13 1800z until June 15 0300z. Competition categories are single operator multiband, single operator single band, single operator QRP portable, rover, multioperator, and limited multioperator. Exchange grid squares.

Many plaques are offered for high scorers. The segment 50.100-125 is reserved for intercontinental QSO's only. For scoring and other rules, which have not changed since last year, see QST May 1992 pp 126-127.

The SMIRK Party will occur June 20-21; see last issue or contact W5OZI for details.

On July 11-12, starting and ending at 1400z (24 hours), the COMO division of Italy will sponsor the 2nd Lario 6m Contest. Work 2-ways on 6m or, for countries without 6m, crossband. All QSOs within your own continent must be outside the DX Window of 50.100-130. Exchange callsign, signal report, grid square, and, for Italian stations, the province abbreviation. Multipliers are: one for each DXCC country, one for each square, and one for each Italian province. Final score is total QSOs X total multipliers. Special trophies will be awarded for the three highest scores. Logs must contain times, exchanges, and equipment/power details. A summary sheet is also required and must state: 'I declare that all contest rules and all the rules and regulations for amateur radio operations in my country have been observed and adhered to. I accept the decision of the Contest Committee.' Logs must be mailed no later than July 27 to: A.R.I. - Sez. COMO. Contest Lario, PO Box 144, 22100 Como, Italy. Tnx UK6MG.

Also on July 11-12, the revived CQ Magazine VHF Contest will take place. The rules have been extensively revised, with a unique and interesting multiplier format, per N6CW. No additional details have been received; see CQ Magazine or contact its VHF Editor Joe Lynch, N6CL/5.

Apologies to the prominent W station "slandered" in our April 27 issue. I have no first-hand knowledge that any FCC or DXCC rules were broken in making the contacts submitted for the first west-coast 6m DXCC.

Clarification concerning World Records, same issue: I should not have referred to antipodal distance records as "short-path;" this was done simply to distinguish them from real long-path. The time-honored "terrestrial distance records" have never involved decisions as to what path the signals followed; i.e., no questions are asked about beam azimuths in this category. The antipodal focusing effect applies to a region centered on the antipodes, and thus involves geometries which, if viewed literally, could be labeled (barely) as short-path or (barely) as long-path. Such labeling entirely misses the point of the propagation, which is that the whole region will propagate as if it were exactly antipodal. Thus, azimuth is irrelevant. Hereinafter, such records, if they are discussed at all, will be referred to as "antipodal" or "any-path" records. ZL1ANJ's QSO with ZB2BL remains a contender in such a category.

The 50 MHz DX Bulletin was founded by Harry Schools KA3B, is edited by Shel Remington N16E/KH6, and is published by Victor Frank K6FV. Issued at irregular intervals as frequently as possible, it is dedicated to the understanding and utilization of long-distance propagation in the 6-meter Amateur band. Annual airmail subscriptions cost \$20.00 in the US; US\$22.00 in Canada; US\$25.00 elsewhere. Make subscription remittances payable to Sheldon Remington and send to P. O. Box 1222, Keaau HI 96749, U.S.A. Send reports to the editor via mail or telephone 808-982-5800 between 2000-0800 UT. This Bulletin may be freely quoted, provided that credit is given. All dates and times are Universal Time, and given in ISO/ANSI sequence: year/month/date/time.

RECENT PROPAGATION HIGHLIGHTS

Long Path in mid-May?? Yes, Kerry ZK3TPY copied ZD8VHF/b on May 14 at 1048-1124, and again the next night at 1009-1100! Solar flux=126.

Another shocker was May 9, when ON and PA had VK4, and SM had VK5! Solar flux=127.

June 5 0730 ZK3TPY was copied in VK4, and June 6 0315 worked his first ZLs. About the same time he worked into ZL, KH6 was into the west coast USA on double-hop E_s.

W1AW reports a 'phenomenal E_s opening from May 12 1530 to May 13 0300, which included a 'Cape Cod beacon on 50.110' being heard in Cyprus, plus OX and ZD8 being copied strongly into New England. There was also multihop Transcon that day. On May 13 around 2000, W and VE signals were into the U.K.

On May 15, KL7NO and KL7GNG had a prolonged multihop opening to W5-6-7, from 0300 past 0900.

PY5CC had Europe on May 1-3, 11, 13-14, 16, 18-19, and 21; on the 14th around 1930 he worked OK3LQ for country #137! ZP-LU-CX signals were reported into Europe on May 4, 6-7, 13-14, 16, 19, 21, and 23. The 8R1 DXpedition had Europe on May 6-7, and 16-17.

Various combinations of ZS-V5-Z2-A2-FR-D6-7Q-9J-TU were into Europe on May 3-7, 9-10, 12-18, 21, 23, and 24.

CE-LU-ZP-PY signals were into XE2-W6-W5-W8-W1 on May 1, 13, 21, and 24.

On May 1 at 2340, W6 had VK4. On May 2 between 2245 and 2330, 3D2 and ZL were into XE2 and W6. On May 5 at 2245, VK4BRG was apparently heard on the Oregon coast. On May 9 at 0030, ZL2 was into W6. On May 11 at 2040 PY5CC worked ZK3TPY for Kerry's only QSO with anyone in South, Central, or North America.

On May 6 at 0446-0607 Tim V73AT had K6QXY, K6FV, K6MYC, and N6CA; I suspect this was 4-hop E_s, as strong signals from both ends were solid here in Hawaii, near the midpoint of the 7630-km path. K6QXY expressed surprise at the strong signals, since JA signals propagating over similar distances via sporadic-E have always been quite weak. This overlapped with an opening at 0602-0645 between 3D2PO and K6QXY, K6FV, and K6MYC. Later at 0800-0900, K6FV/b was back into V73AT. The next night, May 7, at 0500-0600, Tim V73AT had W6 again, and at 0653, K6FV/b was heard in 3D2. On May 9 at 0535, N6XQ heard 3D2ER. On May 16 at 0508-0700 V73AT worked K6FV and K6QXY again. On May 23 at 0706-0800 FO5DR worked K6FV and K6QXY.

In east Asia, JA and HL signals continue to propagate into VK, day and night. On May 1, at 0655 ZS6AXT reported JA propagation, followed by the last of the season's ZS6-KH6 antipodal propagation at 0740-0758. Later that night at 1445-1645, 5H3RA and the S79 DXpedition were into DU1 (disgusting).

Here in KH6, the last of the South American TEP was noted on May 2 at 2329-2354, with the resurrected ZP5AA/b all alone. 2-3 hop E_s to TI-XE-W6-W7 occurred daily from May 1-8, sometimes as late as 0806, then again on May 14-15, 17-19, and 30-31. The Pacific TEP has opened almost every night to some of: FO5, V73, ZK3, 3D2, 3D2r, T20, H44, and P29. This has prolonged the statistical streak of "at least one 4000-km+ signal daily at N16E" for 121 days and counting, exceeding the mark of 107 set in 1991 (thanks, in part, to new beacons). The paths to VK/ZL dropped out after May 14, but an isolated JA opening (four beacons, no operators) was noted on May 19 at 0616-0642, apparently via 4-hop E_s.

The most surprising event here was intra-Hawaiian E_s on May 8 at 2028-2034, in which KH6HH on Oahu was S9+ with 10 watts at a distance of 365 km (227 miles), the shortest 6m E_s I've ever observed. The secant formula indicates that this cloud's MUF was at least 152 MHz. All previous 6m QSOs between the Big Island and Oahu have been made via backscatter; even at 28 MHz, I've only observed two direct openings on this path, which is obstructed for tropo by 13,800-foot Mauna Kea and Mauna Loa.

NEWS OF OCEANIA

American Samoa: Another grid-square correction has been spotted. This one is for N6AMG/KH8 in 1990. He was operating from Tau Island, which is definitely in grid AH55. The QSL card, however, reportedly shows AH56, which contains empty ocean.

Nauru: In the indicator department, Kerry ZK3TPY reports hearing a radiotelephone from C21 on 48.8 MHz. No recent word has been received from Brian C21BR about his activity, if any.

Philippines: Louis KG6UH/DU1 expects to relocate in a few months to Korea.

Solomons: Peter H44KA is now QRV on 6m with 60 watts into 5 elements at 40 feet. He will be there in Honiara until 1993 September. QSL via KC9V. This is the first H44 6m activity in more than two years.

Rotuma: Antoine 3D2AG in RH87 worked 9H5EE on April 1 2212. QSL: Antoine D R N'Yeurt, PO Box 14633, Suva, Fiji. Tnx 9H5EE.

South Cook Is: Stewart ZK1AA, who was active on 6m in Cycle 21, has taken over the loaner FT620B from Victor ZK1CG, and has made some repairs to it. As Victor's yagi was damaged in a recent storm, Stewart has put up a half-wave vertical. No identifiable signals have been heard by him at all with this setup since he got it going in mid-May, and your publisher is worried that all is not working. However, if FO5DR hadn't been using a beam, he wouldn't have heard anything on 6m during this period either.

Tokelau Islands: Kerry, ZK3TPY, hopes to get off the island on a fuel barge in mid-June. He has already worked some 400 stations in 14 countries on 6m, including PY5CC, KH6, FO5DR, V73AT, V63JC, T20AA, FK8EB, 3D2AG, 3D2CM, VK, P29CW, VS6BG, and JA. QSL to JA1VOK.

Wake Island: Jim VK9NS may be active here in late June, but it's unknown if 6m will be included. Other spots he's considering for future operations include Mellish, Willis, and Kanton! Tnx W1AW.

NEWS OF ASIA

Asiatic Russia: Here are the official results of the April 17-23 "propagation test" at Khabarovsk-City. A total of 502 QSO's were made on 6m; 472 were with all JA call areas. The others were KG6DX, EK0JA, and 28 VK's in areas 2-8. The testing stations were RZ0CZZ (club station of the Friendship Amateur Radio Society of Khabarovsk) and UZ0CWW (club station of the Khabarovsk Railway College). Operators were UA0CDX, CF, CKB, CLL, CQ, CZ; UW0CA, CF, CN, CO, CQ, CW; and RW0CA; co-operators from Japan were JA1UT and JH4RUG. Supporting organizations were the Khabarovsk Union of Friendship Society and the Radio Sport Club KAMIFUSEN of Japan. Thanks were also extended to Ms. Nina L. Fomina, JA5RMR, JA0BEE and the authorities and persons concerned. The rigs were an FT655, TS680S, and IC551; antennas were HB9CV and 6el yagi.

Further on the EK0JA license validity: JA2DDN reports that Romeo has supplied copies of a valid 6m permit to JA1BK and JA1UT, and Hide believes this should be okay for DXCC.

China: JA9AG was active in Suzhou as BT4YHY on May 2-3, with 500w on 6m. He worked some VK's, JA's, P29's, and V73AT, at least. QSL via JA9YHY. Speculation is that he was there to deliver the amplifier to BY4SZ/BZ4SAA as mentioned in VK4BRG's article in this Bulletin last October. Tnx WVHFN and VK4BRG.

Brunei: V85PB, ex G3ZSS in OJ74 is reported active for the coming two years. Tnx 9H5EE.

Cyprus: Adrian G0KOM/ZC4MK will try to operate portable 5B4 during his ZC4 stay at the end of August. Tnx UK6MG.

Peter PY5CC lists contacts with ZC4ST on April 12 and ZC4EPI on April 14. No additional details.

Turkey: TA5ZA is the called being used by Eric, ex F1JKK/TA5 in KM77, since at least May 92. Tnx 9H5EE.

Kazakhstan: VK3OT has received a request for 6m information and equipment help from UL7JC. No further details.

Israel: 4X7OIF is a special commemorative call being used by 4X1IF. Tnx 9H5EE.

Maldives: Yet another operation took place here either from April 23 to 30 or May 1-5 (sources differ) as 8Q7PW, by JA1WPX and JH1PWA. Tnx KG6DX and WVHFN.

Results from 8Q7HP in March show QSOs with 72 JA's, 2 DU's, 3 VS6's, and one each in VK9, 8Q, 7Q, 5H, SV, and 9H. Tnx WVHFN.

Sri Lanka: 4S0UK will be activated by some G's from June 11 to July 4, including 6m. QSL to G8PDW or the RSGB bureau. Tnx W1AW and KG6DX.

The 4S7/JA1OEM operation logged QSOs with 144 JA's, 1 DU, 1 VK, 3 YB's, 3 VS6's, 1 VQ9, and 1 9K. Tnx WVHFN.

South Korea: Gary HL9TG (and HL9's DBT and JBT, who share the rig) is now using a 5 or 6 element beam at 100 feet above ground. Tnx VK3OT.

Lebanon: OD5SK, Samir, in Tripoli - KM74wk (not KM73), is QRV only on weekends. He runs 4W (instead of 10W) from a transverter into a G.P. (no beam yet) at 200 feet high with an open view all round, especially to the Mediterranean. He is also working on a beacon which will be on a mountain with remote control from his shack. Tnx 9H5EE.

NEWS OF NORTH AMERICA

Alaska-Canada-U.S.: Glenn WB7QBS will be traveling north again this summer, activating rare grids along an extensive itinerary, from June 27 to July 8. Here is the plan: CN96 Sunnyside WA, DN06 Pasco, DN07 Ritzville, DN17 Spokane, DN18 Newport, DN28 Troy MT, DN38 Apgar, DN39 Cardston AB, DO30 Vulcan, DO20 Calgary, DO21 Canmore, DO11 Lake Louise, DO12 Rampart Creek, DO02 Jasper BC, DO03 Croyden, CO93 McBride, CO83 Prince George, CO74 Vanderhoof, CO64 Houston, CO65 Hazelton, CO55 Kitwanga, CO56 Meziadin Junction, CO55 Stewart, CO45 Hyder AK, CO46 Mt. Welker, then back to Prince George BC, CO82 Quesnel, CO91 100 Mile House, CO90 Cache Creek, DN09 Princeton, DN08 Oroville WA, DN07 Azwell, CN97 Orondo, DN07 Quincy, DN06 Vantage, and back home to CN96. QSL to Glenn S. Skinner, 931 Grandview Ave, Sunnyside WA 98944-1707.

Glenn, in response to your query about panhandle Alaskans on 6m, I know of only two. KL7GIH was listed in CO45 on KA3B's 1990 survey of Alaskan ops, but I've seen nothing further about him. Bill AL7KX is in CO27 and likes to run RTTY on 50.105 with an IC-575H into a vertical. His phone is (907) 747-8598, or you can write to William McVey, Box 323, Sitka 99835.

Alaska: Tom NL7OW has upgraded his license, and is now showing up on 28885 for liaison; hooray!

Anguilla: Someone is active here May 25 to about June 4 with high power. No further details.

Terry N6CW/VP2E will be active on 6m June 29 to July 6. He hopes to have 500 watts and 5 elements, and plans to use 50.123 as his primary frequency. Brian K6STI will also participate. They also hope to be on 2m E-M-E. QSL to N6CW. Tnx Terry.

Aves I: QSL requests for the recent YX0AI operation are reportedly being pilfered in Venezuela. An alternate, presumably more secure, route is via Pablo Alonso, P.O.Box 68353, Caracas 1062-A, Venezuela. Identify CW or SSB in the lower left corner of the envelope. Cards were being printed in mid-April. Tnx TDXB.

Bahamas: Steve N4JQQ and his friend K6LEW will operate C6AFP in locator FL16 from the afternoon of June 10 until noon on June 15 (including the VHF QSO Party). They will be on SSB and CW with IC551D's and 6 elements, will try to run a beacon, and will monitor 28885 for liaison. QSLs go to Steve Rutledge, N4JQQ (SASE please); do not try to QSL via the C6 bureau.

Here are the results of the March 6-31 phase of Bill KM1E/C6A operation. 53 QSO's were made with 13 countries as follows: CU1EZ, CT3FT, W4-5-7, HI8A, KP4EIT, TI2NA, FO0CI, HC2FG & HC1BI, 6 PY's, 1 CX, 22 LU's, ZP6CW, 5 CE's, and ZL2TPY. Beacons were also heard from V51 and FY7. KM1E/C6A will be reactivated in late November. Tnx Bill.

Belize: Jim W6JKV reactivated V31IV from May 21 to 26. QSL to his home call.

Canada: VE3ONT, the Toronto VHF Society's station, will be active at VE3ASO's Mountain, Ontario site in the multioperator category in the June VHF QSO Party. Among the expected operators are VE2DUB, VE3ASO, VE3BFM, VE3FN, VE3HJK, VE3KDH, VE3VD, KA2RDO, N2IQU, AND W9IP. Look for their big signal on all bands/modes. Tnx QST Canada.

El Salvador: Steve WA1AYS has obtained an SB-110 for donation to Andy YS1AG. Tnx K1FJM. This will free up the IC-551D which Jack N6XQ had loaned to Andy. Jack may use it for a possible DXpedition around March 1993 to Bolivia.

Greenland: Bo OZ1DJJ/OX3LX will make another trip this summer in conjunction with his work. The locations will be: May 18-29 GP35, June 22-July 3 GP52 and others, August 24-September 3 GP82, and September 1-25 GP52 and others. Bo will have 50 watts to 4 elements. Tnx OZ4VV via UK6MG.

Continuing active are OX3LK in GP50 with 65 watts to a GP, and OX3CS in GP60 (only 200m from the beacon) with 10 watts to a vertical. Tnx OX3LX/OZ1DJJ via UK6MG.

Guatemala: Juan TG9AJR has now received the Swan 250, and, while constructing a beam, has installed N/S and E/W dipoles for 6m. He has shown up for liaison on 28885.

Joe W9JUV requests QSL information for TG9NX. Per KA3B's new Manager Listing, TG9NX cards go via N4FKZ.

Haiti: We are very pleased to report that Pat HH7PV has a new QSL manager: Jim AA5DW. Jim reports that the cards are being printed and will be available in early June; he does not have actual copies of the logs, but will instead confer biweekly with Pat via HF regarding each contact. It is unknown whether the cards and SASE's on hand at N2AU have been forwarded to Jim. Tnx VK4APG. Erik TI2NA confirms the above, and notes that he had a 90-second 6m opening to HH7PV on May 9 at 2026.5z, while the Shuttle was over the Caribbean, and he attributes it to ionization created by a short rocket burn! The path length is about 1600 km (1000 miles).

Mexico: On May 22-24, XE2HWP and friends operated XF1IA from Isla Altamura in the Gulf of California, but reported no propagation. Also, on May 2, Bernardo operated from Isla Cerralvo at the opposite end of square DL54.

On May 16-17, Tony XE1GRR was active on 6m from 4000m ASL on Nevado de Colima, grid DK89.

In early/mid-June, Jack XE2/N6XQ will be mobile in various Baja grids enroute to and from DL27. During the ARRL Contest (June 13-15), Jack and Bernardo XE2HWP will activate DL27.

From June 9-20, the third annual XE2/N6CW VHF expedition will occur, hoping to activate most of the Baja grids, with a mobile beacon on 50.125 (and operation in the DX Window if things get hot and heavy). During the ARRL Contest, he will be in DL53 or 52. Tnx Terry.

During the ARRL Contest, Peter XE2/W9DHK will be active from Ensenada in DM12. Also K9VV and NF6L will be active from DM10 and/or DM20 during the 'Test, but which call sign they'll use is uncertain. Tnx N6CW.

St. Christopher (St. Kitts): Craig WB7RFA was expected to be active as V47ITU or V40X in the CW WPX contest at the end of May; he may appear on 6m. Tnx N6CW and W1AW.

St. Pierre et Miquelon: Ron FP/VE1KM should now be QRV with a rig donated by Harry KA3B, running 10 watts into a vertical. Harry, who has extensive FP experience, chose the vertical instead of a yagi due to the extreme weather conditions on St. Pierre (better a vertical that will stay up rather than a smashed beam). If Ron doesn't have problems with RFI, and if he proves serious about 6m, then Harry will probably supply him with an amplifier at a later date. Also, Ron has an IC-502 but needs a schematic for it, if anyone can help. Harry says Ron is anxiously looking forward to E season! QSL to Ron Thompson, BP 383, F-97500 St. Pierre et Miquelon, VIA MONTREAL, CANADA. Mail delivery via Montreal appears to be pretty quick.

Turks & Caicos: Harry KA3B will be operating here from June 11 to 16 (covering the ARRL VHF QSO Party) with an IC-551D and either a 3-element beam or a vertical. He has requested a special call sign of either VP5SIX or VP5VHF. QSL to Harry Schools, 1606 South Newkirk St., Philadelphia PA 19145.

NEWS OF SOUTH AMERICA

Brazil: Gleaned from the logs of Karl PS7KM, Peter PY5CC, and your editor, here is a listing, by state, of 66 active Brazilian 6m stations. A fine map showing states and prefixes can be found in the ARRL Operating Manual.

Espirito Santo: PP1XR
Santa Catarina: PP5AO, BC, SG, WL
Alagoas: PP7AAD, HS
Paraiba: PR7RP
Rio Grande do Norte: PS7KM
Distrito Federal: PT2SC
Ceara: PT7AQ, AX, BZ, CB, NK
Mato Grosso: PU9WAW
Mato Grosso do Sul: PT9FH
Rio de Janeiro: PY1DFF, QP
Sao Paulo: PU2LDU, MZF, OZF, TOK, WBS; PY2ANE, BJM, BQM, BW, DJC, DM, DSC, ELZ, EX, GNS, GR, GWH, HDY, IAX, KP, NA, PD, SB, VA, WG, ZS
Rio Grande do Sul: PU3WPA, YTY; PY3CRX, PQ, TJ
Minas Gerais: PY4ACE, IF
Parana: PY5AQ, BAZ, BI, CC, EJ, EX, GK, ZBU
Bahia: PY6BN, XO
Pernambuco: PY7JJ, LU
Para: PY8TH, ZBP

States/Territories with no known activity are: Goias (PP2), Sergipe (PP6), Amazonas (PP8), Maranhao (PR8), Piaui (PS8), Acre (PT8), Amapa (PU8), Roraima (PV8), Rondonia (PW8), and Mato Grosso (PY9). It looks like a WAB award is not yet within reach on 6m!

Mauri PT7CB says he will activate GI96 and GI97 later this year. I would suggest going in late September or October, Mauri.

Colombia: W5OZI notes that the HK4BHA address is incorrect in the callbook. The correct address appeared here a few issues back, but here it is again: Ricardo Trujillo V., P.O.Box 50405, Medellin, Colombia. The locator would be FJ26. Tnx Pat.

Falkland Is: Adrian G0KOM/ZC4MK will activate VP8 for approximately 4 months, starting in October or November. 6m operation will have priority, with plans for high power. Tnx UK6MG.

Peru: Alfonso OA4PQ is newly active from Lima (FH17); he is probably the only active Peruvian on 6m. His rig is a TS520 with a TV506 transverter, running 10 watts into a 3-element beam. His QSL route is P.O.Box 538, Lima, Peru. He can also be reached on packet @OA4O or OA4CK, and suggests routing via N8GTC.

Trindade & Martim Vaz Is: The Natal DX Group are planning another trip to Trindade, for a total of 8 weeks beginning in early October. The operators will be PS7KM and PT7AA; all modes and bands including 6m will be covered. Tnx PS7KM via UK6MG.

Argentina: LU2DEK, Tom in GF02, is not OK in Callbook. QSL: Manuel D. Tomaz, PO Box 168, Tandil 7000, Argentina. Tnx 9H5EE.

Chile: XQ0X, John on San Ambrosio Island, FG03, made contact with a skeptic and sole 9H5EE Mar 22 1510. This was later confirmed by PY5CC. QSL (CE3ESS) Mickey Gelerstein, PO Box 9834, Santiago, Chile. Tnx 9H5EE.

XQ3SIX, Kevin in FF46, has lost his KB6GL/CE3 call on gaining permanent residence in Chile. Being a top class operator gets him the XQ prefix instead of CE. QSL: (NI6V). Tnx 9H5EE.

NEWS OF EUROPE

Andorra: KG6DX reports two items seen in a packet message out of Denmark recently. One is that C31ZK has a temporary permit for 6m. The other is that C31/PA0RDY will be active June 6-13. From Ivo ZS6AXT we hear that Servaas ZS6XL worked a C31 in April.

Belarus: The planned UA2F operation in July (see Kaliningrad) may also be able to get a permit in UC. Tnx UK6MG.

England (and general U.K.): A reminder that G--- Novice class licensees cannot operate below 51.250 MHz. Their activity frequency is around 51.260. G3OIL suggests in Six News that we all put that frequency in memory and scan it from time to time to give these newcomers a chance to work some DX. Tnx Mike.

To celebrate the 10th anniversary of the UK6MG, the group is sponsoring the special callsigns GB3SIX and GB6SIX. These will be activated every weekend from June 6 to August 30, from different parts of the country. The coordinator for this activity is Cliff G1IOV. Tnx Six News.

Estonia: Another ES0SM operation has been announced, tentatively set for June 25 to 30. They will be concentrating on 432 E-M-E, but will also be QRV on 6m and 2m. Tnx SM0KAK via UK6MG.

ES1CW is now active in KO29. Tnx GJ4ICD.

European Russia: The planned UA2F operation in July (see Kaliningrad) may also be able to get a permit in UA3. Tnx UK6MG.

Ireland: EI2EFB is new on 6m, and has already worked VK. He is too new to be found in the callbooks, so here is his direct QSL route: John Edmundson, Drumbuo, Lifford, Co. Donegal, Eire. Tnx G4UPS.

Jersey: Joe W9JUV is requesting help with a QSL route for GJ0JSY. Joe's address is Box 406, Glenview IL 60025.

Kaliningrad: Mike UL7GCC says the planned 4L2FM operation from KO04 is still 'all go,' to begin around July 1 for about 1 month; a later report says mid-July until sometime in August. UL8GDD and PA3EUI will also participate. Contributions would be appreciated to offset the costs. The QSL route is direct only to PA3EUI: Peter van der Woude, Sparrendal 610, 3142LT Maasluis, Netherlands. Tnx UKSMG and G4UPS.

UA2FJ is now QRV from KO04 with a transverter, 400 watt amplifier, and 5 elements. Tnx UL7GCC via GJ4ICD.

Malyj Vysotskij: Another 4J1FS operation is scheduled for May 26 to June 9; no mention of whether 6m will be included. Tnx W1AW.

Monaco: 6m operation in 3A remains strictly forbidden. Tele Monte Carlo holds the rights to this part of the spectrum and does not want to yield them, even though they are not being used for anything. However, Daniel 3A2LZ notes that discussions are going on to obtain 6m amateur access. He says this is a definite possibility, but doubts that it will happen in 1992. When it does, there are at least 2 or 3 Monaco stations that will be QRV at once. Tnx UK6MG.

Poland: Chris SP4TKK reports that all rumors of SP permits having been granted are false, as of March 28. The Polish authorities have returned from WARC-92, but have said the 6m question must wait. Chris doesn't know how long this wait will be, but his father is in the PTT and so he will be the first to know! Tnx UK6MG.

On April 30, word came from Europe via K1JRW and VE3KKL that Polish activity will definitely commence by early June. GJ4ICD has received a fax sent out by SP4TKK's father, the Secretary of State for SP, stating that Poland would be QRV the last week of May or the first week of June.

SP4TKK now has an FT690R (donated by the UKSMG?) and an amplifier (donated by Nevada), and should be the first legal station active on 6m. Tnx GJ4ICD.

9H5EE observes in a letter dated May 24 that rumors of SPs coming on six proved themselves to be unfounded.

Vatican: HV3SJ is looking for a donation of a 6m transceiver to use with the existing 6m yagi. If you can help, contact I0DUD or W7SW.

Yugoslavia: YT3ET provides this list of active 6m stations from Slovenia: YU3AN, AR, CN, EA, ES, ET, EU, GO, IT, KV, OV, QM, RW, TG, UF, ZM, ZO, ZV, and ZW. Tnx UK6MG.

YU's callsign prefixes for the separations might be replaced with S51, S52, and S53 in the future, according to Fredi-YT3ZW. Drago-YU3ZV believes that the effective DXCC status date should be mid-January 92. Tnx 9H5EE.

Bulgaria: LZ1JH in KN22wr worked 9H1CG on CW May 15 after 1800.

NEWS OF AFRICA

Ascension Island: ZD8SA, a new station, should be active on 6m. Also, G7HOV has sent a 5-element beam for use at the club station. Tnx GJ4ICD.

Botswana: Dave (ex-9L1US, J52US, etc.) Heil's callsign turns out to be A22MN, and W1AW reports that he's been active on 10m and 15m. QSL to WA8JOC.

Central African Republic: FC1OMZ/TL is active here, and has applied for a TL callsign. The locator is given as JJ94. Tnx ZS6AXT.

Comoros: Bernard D68BR (DJ3OS) was active in LH18sq on 6m, May 22-25. He worked into the U.K., at least.

Glorioso Islands: Bernard DJ3OS/FR was active in LH38 on 6m from May 14 to May 19, and worked into Japan, Hong Kong, and Europe. QSL: Bernard Ritter, Schusslerstr. 16, D-6145 Lindenfels-Kolbach, Germany. Tnx 9H5EE.

Mayotte: FH4AA, Jack (F6ECS) LH27, made his appearance on six in April. QSL: Jacques Respaut, 24 Ave Paul Reig, F-66200 Eine, France.

After the FH4AA operation, the rig was passed along to FH8CB. QSL: Elio Fontaine, PO Box 50, F-97610 Dzaoudzi, Mayotte. Tnx ZS6WB and 9H5EE.

Morocco: Two more new stations are active: Chris CN8HB in IM63, and CN8FD. Tnx GJ4ICD.

CN8BA in IM63hq is QRV on six and two. QSL: Mohammed Bouhannana, 114 Rue Chabab A Al Alia, Mohammedia, Morocco. Tnx 9H5EE.

Namibia: Many 6m buffs will remember Tom ZS3AT who was very active a few years ago before he returned to Germany. In late March, for about a month, Tom was active again as V51AT, from the shack of Derick V51DM. QSL via his home call DF2JQ. Tnx G4UPS.

St. Helena: More details about Chuck ZD7CRC: he has 25 watts to 5 elements, from a site about 40 feet ASL, with a clear shot west. His likeliest 6m operating hours will be Sundays, Mondays, and Tuesdays at 1600-2100z. In addition to 28885, he has also been spotted on a DX net at 1500z on 28480. ZS6WB is hoping to arrange a QSL manager, as there is no airstrip on the island and sea mail can take quite awhile. Meanwhile, QSLs go direct to Chuck Chalmers, P.O. Box 126, Isle of Saint Helena, South Atlantic Ocean. Tnx G4UPS et al.

Seychelles: From April 23 to May 4, Mako JA1OEM operated as S79HP, with 50.123 as his primary frequency, listening 50.173. He is known to have worked into Europe and the far East, at least. 9H5EE reports he was into Malta April 26 for a few days.

South Africa: Derek H5AMN is now active from Boputhatswana (KG44). Of course, for DXCC, this counts as South Africa. Tnx UK6MG.

ZS6PJS, Paul, goes to KG55ta from June 5 to 26 with 150W into 5 el. QSL: PO Box 3041, Pietersburg 0700, R.S.A.

ZS70SAN was a special call sign being used on 6m by only ZS6YA (ex-ZR6EMN), to commemorate 70 years of South African Navy. QSL: c/o Etienne Swart, PO Box 14, Honeydew 2040, R.S.A. Tnx 9H5EE.

Zambia: Peter 9J2HN is out of the country at the moment, but 9J2KY is using Peter's rig in his absence. 9J2HN will be back in Zambia soon for another 12 months. Tnx G4UPS via K6ODV.

9J2KY is in Lusaka, grid KH44, QSL via JA8XPX. Tnx ZS6WB and GJ4ICD. 9H5EE reports direct QSL: Kenji Yokoyama, PO Box 30027, Lusaka, Zambia.

9J2MK was worked by GJ4ICD on May 6; Tnx Geoff. 9H5EE reports his QSL route as: (JK1UWY) Hisano Noda (ex-9J2HN) 1-28-36-1212 Bunka, Sumida-Ku, Tokyo 131, Japan.

Benin: TY1ABE was worked by 9H1GB and then 9H5EE on CW April 6 after 2100. Conditions were marginal and selective. 9H5EE reports that he could copy him only on a vertical dipole, not on a 4el beam, and at least two other 9H's could not copy him. QSL info received as via F1ABC (not clear copy). No card has yet been received from his callbook address in Benin. Tnx 9H5EE.

Ivory Coast: TU2MA, Toure, was worked by 9H5EE on April 19 2145. He gave his grid locator as JJ15xh, but must be wrong. QSL: Michel Toure Vakaba, PO Box 520, Abidjan 01, Ivory Coast.

Western Sahara: S01MZ, just like S01A before him, is in IL56fi. Is this just a callsign change? QSL: EA2JG. Tnx 9H5EE.

Malawi: 7Q7TA, Taka, is in Lilongwe KH66. QSL: JH1OGC, Kazuo Yuyama, 379 Saruyama, Minamiashigara, Kanagawa 250-01, Japan. Tnx 9H5EE.

7Q7XX, Kay, in KH66, hopes to operate from Lake Malawi in July/August. QSL: JH3RRA, Shinya Takenaka, PO Box 21, Katano, Osaka 576, Japan. Tnx 9H5EE.

BEACON NEWS

Brazil: Peter PY5CC is interested in operating a beacon, and has requested a donation of same. He has located an excellent site about 12 km north of his QTH, atop a telco tower 100 meters high!

Ecuador: From a late response to KA3B's survey, here are the full details of HC2FG/b. It operates on 50.092 from Guayaquil, Ecuador (FI07bu), with the CW message "V DE HC2FG/B." The transmitter is homebrew with a crystal oscillator, running 8 watts into a halfwave J-pole at 30 feet height. It is stated to be 24 hours, but Gus has stated in recent QSO's that it is off the air when he is listening (which is a lot of the time). If we give him strong encouragement, he will consider putting it back at a remote site where it could run longer without QR'ing Gus. Send reports to Gustavo Falconi, P.O. Box 1233, Guayaquil, Ecuador, South America. Tnx KA3B.

Gibraltar: ZB2VHF/b is back on the air as of May 1, and is being copied regularly by PY5CC. The frequency remains about 50.035. Tnx Peter.

Hawaiian Islands: In order to boost the signal of KH6HME/b into North America, Russ KH6FOO has designed a wide-spaced 4el yagi to replace the dipole (which is oriented with a null in that direction). This should produce a net improvement of 15-20 dB in stateside signal strength. W's who want to see this happen might put in an encouraging word to Paul KH6HME; otherwise it'll be on the back burner.

Lebanon: The OD5 beacon was to be completed and shipped at the end of March to Samir OD5SK, but this was held up while mods were made to eliminate spurs on 62.5 and 75 MHz. It will have 10 watts into a quarter-wave vertical, situated atop a building overlooking the Mediterranean, at 135 feet ASL. The frequency is nominally 50.078, and the message is 'OD5SIX KM74.' Grateful thanks go to GJ3RAX, GJ4ICD, and the UK6MG.

Mexico: Jack N6XQ has completed construction of a 25-watt output beacon transmitter for northern Baja California. The frequency will be 50.028, and Jack hopes to select a site and put it on the air around the time of the June ARRL VHF QSO Party. Possibly it will have a gain antenna.

Paraguay: The ZP5AA machine is back on the air after about 6 weeks' outage. It has been relocated to a site in Asuncion, operating into a vertical dipole just a few feet above ground on the side of a tower. Nevertheless, within 24 hours of its reactivation, it was copied twice in Hawaii. Tnx ZP6CW.

Puerto Rico: Tim KP4BZ has a beacon on the air! The transmitter is a Johnson 6n2 sent by Mick K1IKN, and the IDer was contributed by Pat N4LTA. It runs 24 hours with 20 watts on 50.040 (uncoordinated), into a vertical at a good site 3500 feet ASL. Tnx W9JMS.

South Africa: Here is another late response to KA3B's beacon survey, regarding ZS2SIX/b. It operates on 50.005 from Port Elizabeth, R.S.A. (locator KF25ux). The transmitter is homebrew, solid-state, crystal-controlled, running 25 watts FSK into a dipole radiating north-south at 90 meters above ground atop a university P.E. building. The message is "V V DE ZS2SIX KF25UX," and operation is continuous. Send reports to Mike Bosch ZS2FM, P.O. Box 1614, Port Elizabeth 6000, R.S.A. Tnx KA3B.

United States: PY5CC reports hearing, on May 13, a very weak WB0--- beacon on about 50.070, giving a grid of EM13, which would be north Texas. Does anyone have any further details?

Zimbabwe: Mal Z23JO is making inquiries regarding a call sign to be used on a new Z2 6m beacon. More details to follow. Tnx GJ4ICD.

THE UNITED KINGDOM SIX-METRE GROUP

We salute the UK6MG on the occasion of their Tenth Anniversary! This organization is very active in promoting and sharing information about the Magic Band, in the U.K. and elsewhere. They publish a 48-page quarterly, offer numerous awards, sponsor contests, and maintain a beacon fund. They now have membership agents in the U.S. and Australia, as well as many countries in Europe and Africa. Annual membership (payable to UKSMG) costs 7 pounds in the U.K., 9 pounds in Europe, or US\$22 elsewhere. The addresses: P.J. Turner G4IIL, Flat 6, 132 Marine Parade, Brighton, Sussex, BN2 1DE, U.K.; Charles Ruhlmann WA2LPG, Summer Street, Dover Plains, NY 12522; or Steve Gregory VK3OT, 39 Gordon Road, Hamilton, Victoria 3300, Australia. Other agents include OZ1IZB, SP4TKK, PA3BFM, FC1OIH, EA2LU, I7CSB, 9H5EE, and ZS6WB.

The First Worldwide VHF Ionospheric Propagation Symposium

As described two issues ago, this Symposium will be held in conjunction with the CSVHF annual conference in Kerrville, Texas, in mid-July. Thanks to Dave Batcho N5JHV, who will be the program moderator, here is the preliminary lineup of papers to be presented.

Friday, July 17:

A Worldwide System of Smart 6-Meter Beacons

by Bob Cooper Jr., ZL4AAA

Solar Influences on VHF Ionospheric Propagation by

Norm Cohen of NOAA's Space Environment Services Center

Profile Structure of the E Layer

by Frank Stewart of NTIA's Propagation Modeling and Applications Group

Correlating Sun Noise Measurements To Solar Activity

Data by Paul Wilson W4HHK and Paul Schuck N6TX

Sunday, July 19

Thirty Years of Sporadic-E Observations

by Pat Dyer WA5IYX

Trans-Atlantic E. Openings

by Emil Pocock W3EP

An Overview of 50 MHz Propagation Modes and Conditions by Steve Wagner W7CI

Panel discussion of 50 MHz propagation during Cycle 22 featuring well-known visitors from various parts of the world.

It looks like Dave and friends have put together a fine program, and I hope many Bulletin readers will be able to attend. To register, contact Bill Tynan W3XO at (512) 896-0336, or HCR 5 Box 574-334, Kerrville, TX 78028. All Symposium and CSVHF papers will be published in the annual Proceedings by ARRL. Also, SMIRK will hold its annual breakfast on Sunday morning.

Annual Japanese 6m Group Meeting

The annual national 6m group meeting will be held in Kumamoto (JA6) on July 11-12. Further information can be obtained from JF6DEA. Tnx WVHFN.

EQUIPMENT NEWS

Pat Bunn N4LTA, of Six-Two-Four Systems, is back in production with the 10-100CO 50 MHz 100-watt ssb/cw linear amplifiers. Circuit board stocks had been exhausted, and some potential customers had to be turned away, but a new batch of boards is now on hand. This popular amplifier was presented as a project in QST for October 1989, and was also described in The KA3B 6 Meter Report in the January and February 1990 issues. Prices remain the same as in the original article: \$17 for the board, or \$100 for the kit. For further information, write to Pat Bunn N4LTA, Rt. 11, Springlake Drive, Spartanburg SC 29302.

Tokyo Hy-Power Labs HX-650 transverter: Peter W9DHH spotted a data sheet at the Ventura UHF Conference describing this unit. The price is expected to be about \$400-450, but U.S. distribution is still uncertain. The IF is 28-30 MHz; it uses two crystals to cover 50-54 MHz. The crystal for the 50-52 MHz range can be replaced by an optional HSO-650 TCXO for ± 1 ppm stability. On receive, it has two separate, selectable front ends. One circuit uses an MGF1302 GaAsFET; the other uses a more crunch-resistant pair of 2SK125 JFETs. On the transmit side, it accepts

input drive of either 0.1 or 1.0 Vrms, and output power is selectable at 10 or 50 watts. It has a remote-control terminal which can be used to automatically shut off the high-level stages of the associated transceiver. VSWR-sensing circuitry automatically reduces the output for protection. Power required is 13.8 VDC.

Homebrew Geomagnetic Monitors: It is well known that short-term variations of the Earth's magnetic field can have strong effects on 6-meter propagation of several types, although the exact nature of the relationship remains obscure. We're all accustomed to listening to WWV or WWVH for SESC geomagnetic data, but those data are limited to the simplistic Boulder K and A indices. For a more detailed view of geomagnetic variation in *real time*, it is not difficult to homebrew a magnetometer or earth-current monitor. Here is an abbreviated bibliography of project articles appearing in amateur publications.

Magnetometers for Investigating...Magnetic Phenomena, by L. George Lawrence, *Popular Electronics* May 1978, pp 41-46. [five different designs described]

Brief Description of Magnetometer, by A. McWilliams, *VLF Experimenter's Newsletter* (published in association with the AAVSO Solar Division), No 1, December 1980. [magneto-optical design]

Magnetometer Electronics, by Al S. McWilliams, *VLF Experimenter's Newsletter* (published in association with the AAVSO Solar Division), No 7, June 1981, p 1, 5. [design using torsion magnetometer driving a slug into inductor, controlling oscillator]

Simple Magnetometer, by Gote Flodqvist, *VLF Experimenter's Newsletter* (published in association with the AAVSO Solar Division), No 8, July 1981, p 1, 5, and No 9, August 1981, p 1, 3. [magneto-optical design]

Magnetic Storm Detector, by C. H. Hossfield, *Solar Bulletin (Journal of the AAVSO Solar Division)*, Vol 37 No 11, November 1981, p 3. [magneto-optical design]

A Jam-Jar Magnetometer, by R. Livesey, *Journal of the British Astronomical Association*, Vol 93 No 1, December 1982, pp 17-19.

Recording Jam-Jar Magnetometer, by R. H. Hatfield, *Journal of the British Astronomical Association*, February 1983.

Flux-Gate Magnetometer, by D. O. Pettitt, *Journal of the British Astronomical Association*, February 1984, p 55.

Earth-Current Detector, by Bob Null N4QR, *The Lowdown (Journal of the Longwave Club of America)*, March 1988, p 19. [microammeter connected to ground rods]

Recording Jam Jar Magnetometer, by H. R. Hatfield, *The Lowdown (Journal of the Longwave Club of America)*, July 1988, p 35. [Hall-effect design]

Chart Recorder Construction: A descriptive Bibliography With Suggestions, by Steve Hansen, *The Lowdown (Journal of the Longwave Club of America)*, July 1988, pp 25-26. [not specific to magnetometers, but useful information not seen elsewhere]

G3UKV's Kilner Jar Magnetometer, in Technical Topics by Pat Hawker G3VA, *Radio Communication*, Vol 64 No 7, July 1988, pp 521-522.

Twin Hall-Effect Magnetometer, by D. J. Smillie GM4DJS, *British Astronomical Association Aurora Section Newsletter*, No. 13, July 1988.

A Jam-Jar Magnetometer as "Aurora Detector," by Ron J. Livesey in Gleanings for ATM's, *Sky & Telescope*, October 1989, pp 426-432. [magneto-optical design]

Building a Jamjar Magnetometer, *Astronomy Now*, January 1990. [Hall-effect design]

Radio Auroras, by Charlie Newton G2FKZ, published by the Radio Society of Great Britain, 1991, pp 74, 89, 91. [no specific project details, but good overview of geomagnetism and propagation]

A Magnetometer, by Geoff Brown GJ4ICD, *Six News (Journal of the U.K. Six Metre Group)* Issue 32, January 1992, pp 15-16. [based on a Hall-effect design by Ken G8VR and Martyn Vincent G3UKV]

A Twin Hall Effect Magnetometer, by D. J. Smillie GM4DJS, *Six News (Journal of the U. K. Six Metre Group)* Issue 33, April 1992, pp 6-7.

Plotting of Magnetic Deviation and Aurora, Parts One and Two, by D. J. Smillie GM4DJS, *Radio Communication (Journal of the Radio Society of Great Britain)*, February and March 1992. [magneto-resistive design, stated to be more stable than Hall-effect designs]

Determination of Great Circle Distances

by the Mad Hacker

The following text describes the program listed in the April 1992 issue. Formulas for determining distance and bearing between any two points on the surface of the earth have long been available (for instance) in the A.R.R.L. Antenna Book, in the form:

$$\cos D = \sin A \sin B + \cos A \cos B \cos L$$

$$\text{and, } \sin C = \cos B \csc D \sin L$$

where A = your latitude in degrees

B = the other location in degrees N

L = longitude difference between you and the other location

C = the direction of the other location, deg E or W of North

D = distance along path (one degree = 60 nautical miles)

The above assume a spherical earth. In fact, due to centrifugal forces from its' rotation, our planet's figure is an oblate spheroid with equatorial radius of 6378.16 km and polar radius of 6356.77 km. That figure does not include the irregular ground surface, but is instead of the mean sea-level surface or geoid.

That 21.4 km difference in radii may seem inconsequential to most of us, but not if you're lobbing ICBMs around, or competing with other radio amateur for distance records. Instead of assuming 1 minute of arc equals 1 nautical mile we should also recognize that the arc length is the central angle in radians times the radius.

But wait, there's more to this than just correcting for the average earth's radius over a path. You see, we aren't where most of us think we are. Unless you are located near the equator or one of the poles, your latitude is not equal to the central angle between you and the earth's equator.

How do we determine where we are on the earth? From the stars, of course. We can find a parallel to the earth's axis of rotation quite easily. Polaris is presently within 50' of being directly overhead of the earth's North pole. To determine our latitude, we would measure the angle between the earth's axis of rotation and our local horizontal. Said horizontal being perpendicular to the direction a plumb bob points—on a transit we do this with leveling bubbles.

Hold on to your hats! Unless you are near the equator or poles, the plumb bob line misses the center of the earth. It is pulled slightly toward the equator by the excess mass there. The angle a surveyor measures is the geodetic latitude. The actual central angle between the equator and yourself is your geocentric latitude.

Having placed ourselves properly with respect to the equator we can more accurately determine the central angle between two stations at mean sea level. Knowing the earth's radii at points along a path we can more accurately determine the distance.

This program GEODESIC does this calculation, but it is still an approximation, because the geodesic, the shortest line on the spheroid joining two points on it, is not a plane curve. We have assumed that it is. Unfortunately the error is greatest between stations at antipodes. Take, for instance, two stations located on the equator, 180° apart in longitude. There are an infinite number of paths linking them, but the two following the equator are 67.2 km longer than the two over the poles. The geodesic may be separated by quite some distance from the "great circle" that this program calculates when the points are near antipodes. However, the radio signals may be traveling over a path that is neither the geodesic nor the great circle. The exact solution of the geodesic, valid for near-antipodes locations is beyond the scope of this article.

Readers desiring further information may refer to Appendix I of *Geodesy* by Brigadier G. Bomford or any recent Geodesy text.

The program in the April issue was written in FORTRAN. We are compiling a number of programs and databases of interest to the radio amateur that will eventually be offered for sale. These will be available for \$4/360K diskette. (More for other formats). Back issues (\$1.50 U.S., C\$2 Canada, and \$2 foreign) are also available from Mad Hacker, PO Box 762, Menlo Park, CA 94026.